R S *Corpora æqualia, vel* R *corpus majus*, S *corpus minus.*
a *Centrum Gravitatis ſive anſa Libræ.* Z *ſumma velocitatum utrinſque corporis.*

$$\left.\begin{array}{l}\left.\begin{matrix}Re\\ Se\end{matrix}\right\}\text{veloc. corp.}\left\{\begin{matrix}R\\ S\end{matrix}\right\}\text{ante impulſum data}\\ \left.\begin{matrix}OR\\ OS\end{matrix}\right\}\text{veloc. corp.}\left\{\begin{matrix}R\\ S\end{matrix}\right\}\text{poſt impulſ. quæſita}\end{array}\right\}\ \text{vel}\ \left\{\begin{array}{l}\left.\begin{matrix}So\\ Ro\end{matrix}\right\}\text{veloc. corp.}\left\{\begin{matrix}S\\ R\end{matrix}\right\}\begin{matrix}\text{ante impulſ.}\\ \text{data.}\end{matrix}\\ \left.\begin{matrix}eS\\ eR\end{matrix}\right\}\text{veloc. corp.}\left\{\begin{matrix}S\\ R\end{matrix}\right\}\begin{matrix}\text{poſt impulſ.}\\ \text{quæſita.}\end{matrix}\end{array}\right.$$

[*Lege ſyllabas* (*quamvis disjunctas*) R e S e o R o S *vel* R o S o e S e R *in Linea cujuſlibet Caſus*, *&* *harum quæ ſcribitur in* Schemate *more* Hebraico, *ea indicat motum contrarium motui*, *quem notat cujuſvis ſyllabæ ſcriptio* Latina: *Syllaba conjuncta quietem Corporis denotat.*]

$$\text{Calculus}\ \begin{array}{l|l|l} R+S:S::Z:Ra & Re-2Ra=oR & So-2Sa=eS.\\ R+S:R::Z:Sa & 2Sa\pm Se=oS & 2Ra+Ro=eR.\end{array}$$

Natura obſervat regulas Additionis & Subductionis Specioſæ.

An Account of two Books.

I. HISTORIA CÆLESTIS; Ex Libris & Commentariis M.Stis. Obſervationum Vicennalium TYCHONIS BRAHE, *Dani*, Auguſtæ Vindelic. *An.* 1666. *in Folio.*

These Obſervations of the Noble *Tycho*, as they were procured and preſerv'd by thoſe Three Mighty Emperours, RUDOLPH. II. FERDINAND. II. and III; ſo they were lately by the Command of his Imperial Majeſty LEOPOLD made publick. They are uſher'd in by a *Liber Prolegomenos*, compendiouſly repreſenting the Obſervations made from the time of the very Infancy of Aſtronomy unto that of its Reſtauration by the Illuſtrious *Tycho*; and reduced into 7. Claſſes, *viz.*

1. The *Babylonian* Obſervations; from *A.* before Chriſt 721. unto *A.* 432.
2. The *Grecian*; from *A.* before Chriſt 432. unto the beginning of the Vulgar Chriſtian Account.
3. The *Alexandrian*; from *A. Chriſti* 1. until *A.* 827.
4. The *Syro-Perſian*; from *A. C.* 827. unto 1457.
5. The *Norimbergian*; from *A. C.* 1457. unto 1509.

6. The *Boruſſian*; from *A. C.* 1509. to 1529.

7. *Mixt* Obſervations; from *A. C.* 1529. to 1582.

In which year (1582) do begin the Obſervations of *Tycho* (as is affirm'd in this *Edition*) contain'd in 20 Books, and made in as many years, ending *An. Chr.* 1601, which was the end of *Tycho*'s Life: Of which time yet there being wanting one year (*viz.* 1593) of the *Brahean* Obſervations, *that* is ſupply'd by the *Heſſian*; and by a *Catalogue* of the *Fixt Stars*, made and digeſted by the Authority and Care of that Renowned Prince for Learning and Magnanimity, *William*, Landgrave of *Heſſen*, and by the Labours of *Rhotmannus* and *Birgius*.

To all theſe is added a Continuation of ſuch Aſtronomical Obſervations as were made from the time of *Tycho*'s death unto *An.* 1635, by *Maſtlinus* and *Schickardus*.

Having given the Reader this ſhort Account, I find my ſelf obliged to give him notice withall of a Paper publiſh'd this year, entituled *Specimen Recognitionis* nuper editarum *Obſervationum Aſtronomicarum*, Nob. Viri *Tychonis Brahe*, printed at *Copenhagen* in 4°: wherein are remark'd by *Eraſmius Bartolinus* the more conſiderable Errors in the Obſervations of *An.* 1582. In this Edition of the *Hiſtor. Cæleſtis*, by comparing it with the *Original*, in the power of the preſent King of *Denmark*. In which Paper hopes alſo are given of a more correct Edition, and that of the *Original* it ſelf; together with the Obſervations both from *An.* 1563. to *An.* 1582. and thoſe of *An.* 1593; all wanting in this Edition of *Ausburgh*.

II. R. P. ANDREÆ TACQUET *e Soc. J. Opera Mathematica*; *with many Schematiſmes thereto belonging.* Antwerp. 1669. *in Fol.*

THeſe Works contain,

1. Of *Aſtronomy* 8 Books, wherein the Author hath explain'd the whole Doctrine of that Science in ſuch a gradual Scientifick Order, that now (as himſelf in his own Preface intimates) a Student without the Aid of a Maſter may learn the whole by his own Study, which was formerly not eaſie to attain with the beſt Inſtructions.

It may be, the Inquiſitive *Reader* will be deſirous to know, what *Syſteme of the World* it is, this Author inſiſts on; concerning which we ſhall give you his own words, *p.* 326.

Hanc controverſiam (*ſc. de* Motu Terræ) *Joh. B. Ricciolus* Almag. l. 9. *ea tum eruditione tum copia proſecutus eſt, ut facile omnes in hoc negotio ſuperaverit. Primo,* Copernicanorum *pro* Motu Terræ *Argumenta* 49. *deducit ac deſtruit; pari deinde cura, quæ contra* Terræ Motum *afferri ſolent & poſſunt* Argumenta, *vid.* 77. *recenſet. Mihi vero, cum nihil hactenus in utramvis partem adductum videam, quod Probabilitatis metam excedat, his immorari non eſt animus. Unum eſt tamen ex omnibus contra* Terræ Motum *pſius* Riccioli *Argumentum a* Gravium deſcenſu *petitum*, *cui vim ipſe Demonſtrationis ineſſe putat*; *quod examinare hoc loco accuratius opera pretium judicavi.*

This with other Arguments he refutes; but declareth *p.* 330. That, though he knows no Argument, demonſtrating the *Reſt* of the *Earth* and *Motion* of the *Sun*; yet the Authority of Holy Writ, now ſeconded by that of the Sacred Congregation of the Cardinals, put it out of doubt.

Concerning the Doctrine of *Motion*, the Author ſaith thus, *p.* 15. *Motuum* Compoſitorum *Contemplatio digna ſane eſt*, *quæ a Geometris excolatur. De ſolo motu* Volutionis *conſcripſi Tractatum integrum*, *quem cum libris* Cylindricorum *&* Annularium *in lucem edidi. De Motu* Projectorum, *qui & ipſe* Compoſitus *eſt*, *ſubtiliſſimi exſtant Libri* Galilæi *&* Toricellii: *Et præter hæc*, *alia ſuperſunt innumera*, *de quibus integra Nova Scientia condi poſſit*. (Which is accordingly done by the Excellent Dr. *Wallis* in his Book now in the Preſs.)

For the eaſe of Calculating an *Eclipſe* of the *Sun*, we find, that this Author *p.* 177. determines, in what part of the Earth ſuch an Eclipſe ſhall appear, without the Aid of *Parallax*, and that the Sun's *Parallax*, as to the determination of Celeſtial Motions, may be ſafely neglected. And *p.* 40. he rejects the *Senſible Inequality* of the *Solar* or *Tropical* years; as alſo *p.* 60. the *Irregularity* of the *Obliquity* of the *Ecliptick*, of the *Proceſſion* of the *Equinoxes and* Excentricity. *Pag.* 127. he ſolves that Doubt of *Ricciolus*, That it cannot be exactly and evidently known by any Natural Obſervations made of the Moon or any Star, what the *Parallax* is, without the fore-knowledge of the *Parallax*, or diſtance from the Earth. And *p.* 193. avoids theſe Inconveniences in aſſigning the Declinations of the Fixed Stars. *P.* 338. this Author aſſerts, that the *Comets* and *New Stars*, that have appear'd ſince 1572, have been far *above* the Moon; and that *Ricciolus* about this Controverſie ſeem'd too favourably inclined to *Claramontius*, aſſerting the contrary.

Concerning the Cauſe of the *Secondary* light of the Moon before and after the New, to wit, the obſcure part of her appearing like kindled glittering Aſhes, our Author aſſigns it to be the Suns rays reflected from the bright Hemiſphere of the Earth to the darker portion of the Moon, and thence again directly reflected to the Earth deſtitute of the Sun's light. This *Phenomenon* he ſaith, is learnedly explain'd in *Philoſ. Optica Nic. Zucchii* from *p.* 247 to *p.* 260.

The Author hath not framed nor annex'd any *Tables* to his Book, although he abundantly ſhews, How they may be computed: referring his Reader to thoſe of *Tycho*, *Reinholdus*, *Longomontanus*, *Kepler*, *Lanſberg*, *Wendelinus*, *Bullialdus*, *Petavius*, *Reinerius*, *Ricciolus*; to which may be added thoſe of *Duret*, *Rilly*, *Street* (which laſt fixes the *Nodes* and *Aphelions*) and *Wings*, now in the Preſs.

To the end of theſe 8 Books are annext *Proportions* for the 28 Caſes of

Spherical Trigonometry. Thoſe that deſire to be farther ſatisfied, may read *Trigonometria Britannica* of *Gellibrand* and *Newton*, the *Idea Trigonometriæ* by the Lord Biſhop of *Sarum*, Dr. *Seth Ward*; and alſo *Bonavent. Cavalerii* Trigonometria, and his *Directorium Univerſale Uranometricum*, but eſpecially his *Compendio delle Regole Trigonometriche* & *Centuria di Problemi*.

2. Of *Practical Geometry* 3 Books.

In the *Firſt* the Author handleth

The Conſtruction of the Tables of *Sines*, *Tangents*, and *Secants*.

The Reſolution of Right-lined Triangles.

The Menſuration of the diſtance of Objects, as well unacceſſible as acceſſible.

The Heights of Mountains, Towers, Clouds, Rainbowes; the Depths of Wells and Vallies. He concludes the perpendicular height of the burning Mountain *Ætna* to exceed 5 *Bononian* Miles; of Mount *Caucaſus* beyond the *Caſpian*-Sea to be 51. Mount *Athos* of *Greece* 28. *Caſius* of *Syria* 20. the *Alpes* of *Italy* and *Pic* of *Tenariffe* 10 Miles. The Circumference of the Earth, the Diſtances of the Sun, Moon, and Earth.

In the *ſecond* Book, he handles the Dimenſion of Plain Surfaces, either Regular or Irregular, and takes the *Ichnography* or Deſcription in Paper, of any Figure given of the ſurface of the Earth: Aſſerts the Poſſibility of the *Quadrature* of the *Circle*; and handles the Transformation of Plain Figures, to wit, their Addition, Subſtraction, Augmentation, Diminution, Compariſon; further the dividing of a Plain Triangle, in a given Reaſon by a line paſſing through a Point any where aſſigned: This he doth largely in 16 *Propoſitions*, becauſe upon it chiefly depends the Diviſion of other Right-lined Figures; and becauſe he found divers Determinations wanting, when the point is given within. Thoſe that are deſirous to ſee this *Analytically* done, may find it in *Herigon* with a Conſtruction thereof; as alſo a *Geometrick* Conſtruction thereof in *Van Schootens* Miſcellanea; and another moſt excellent Conſtruction at the end of *Van Ceulen* de *Circulo* & *Adſcriptis*.

Afterwards our Author proceeds to the dividing of other Figures, in a given Reaſon, or by parallel lines, and ſheweth how to apply the whole to *Practice* in the Field.

In the *third* Book the Author firſt meaſureth ſuch Solids as are contained under a Plain Surface. Secondly, ſuch as are contained under a Curved Surface. Thirdly, He meaſureth the *Mundane* Bodies, as the *Surface* of the *whole Earth*; where he is pleaſed to conclude, that at the Day of Judgement, a leſs portion of it then *England*, will ſerve to hold all its Inhabitants, and their Infants, that ever have been, or in likelihood may be hereafter, till then, ſuppoſing the World ſhould laſt 10000 years. He meaſureth alſo the Solidity of the Earth, and Ocean; the Magnitude of the Sun, Moon, and Earth. The Increaſe, and Diminution, the Transformation and Compariſon of divers Solids, and the Menſuration of divers of their Surfaces.

3. *Of* Opticks 3 *Books.*

In the *firſt,* he handleth the *ſimple* and *direct* Appearances of Objects meaning ſuch appearances as are not liable to Reflection or Refraction; and herein he ſaith, that paſſing by ſlight matters, he onely treats of ſuch as are either new, or of the better eſteem; ſuch as are the Properties of the ſight, the manner of its perceiving a Diſtance; and the Place of the Eye being aſſigned, to find that Height, in which a greater Length or Breadth ſhall appear equall to a leſſer Length or Breadth, or any aſſigned Length or Breath ſhall appear in a given Proportion. He likewiſe finds the Portion of a *Cone* or *Cylinder*, ſeen according to the Magnitude of the Figure, and Poſition of the Eye, and explains the Moons *Phaſes.*

In the 2d. He handles the Theory and Practice of the *Perſpective* or *Scenographick Projection,* or Tranſcription of a given Magnitude into a Plain, which cuts the Optick *Pyramid*; wherein he explains the Direct appearance, and the Monſtrous deformation of an Object, which at a certain place ſhall appear beautiful.

In the 3d. He treats of the *Aſtronomick Projections* of the *Spheare,* and thence derives the triple *Aſtrolabe,* and ſhews their uſes, and the Conveniences or Inconveniences of each Projection: *viz.* the Projection on the *Plain* of the *Æquator,* the Eye being in one of the *Poles*; or on the *Plain* of the *Colure* of the *Solſtices,* the Eye being in one of the *Æquinoctial Points*; and the *Orthographick* Projection, by Perpendiculars, falling from the reſpective Points of the Circles of the Spheare, on the Projecting Plain: Such a Projection, if the Plain be the Meridian, *Ptolomy* called the *Analemma.*

If the Eye be in the *Zenith* or *Nadir* projecting on the *Plain* of the *Horizon,* the Author ſheweth, that the Projection will be the ſame, as if the Eye were in one of the *Poles* projecting on the *Plain* of the *Æquator,* onely the names of Circles are changed.

Pag. 205. *Nam Circulus qui in illa referebat Æquatorem, in hac Horizontem repræſentat; & Projecturæ Tropicorum reliquorumq; Æquatori parallelorum in illa, in hac ſunt Projecturæ parallelorum* Horizonti *ſeu* Almicantarath: *rurſum qui in illæ ſunt Projecturæ* Horizontis, Almicantarath & Verticalium, *in hac projecturæ erunt* Æquatoris & Parallelorum *ejus, ac* Meridianorum. *Poſtremo rectæ lineæ, quæ per Centrum Projectionis ductæ, erant projecturæ* Meridianorum *in illa, in hac erant* Verticalium Projecturæ; *quare qui illius Projectionis modum probe intellexerit, hanc quoq; nullo negotio perficiet.*

If this had been well obſerved, there had been no need of Controverting, Whether the *Horizontall* Projection had been a *New* Invention: It is as Ancient as *Ptolomy*, and all the 4 *Quadrants* of ſeveral contrivances publiſhed by Mr. *John Collins*[*], are derived from the *Weſtern* ſide, or the continuance thereof, admitting but a meer Mutation of the Names of Circles, and a projecting of more Parallels.

4. Of *Catoptricks* 3 Books; in the *Firſt* of *which* the Author treats of *Catoptricks* or *Reflection*.

In the *Second*, of the affections of *Plain* Glaſſes ſimply, or of many ſuch, placed either in a Parallel or Inclined Poſition to each other.

In the *Third*, of *Curved Glaſſes*, and therein firſt the chief affections of *Convex* Sphærick Glaſſes; afterwards of *Concave* Sphærick Glaſſes: laſtly of *Burning* Glaſſes of ſeveral kinds.

The death of the Author prevented him from Writing of the *Dioptricks*, which was very far advanced by *Des Chartes*, and hath been further promoted ſince by *De Beaune*, *Honorato Fabri*, *Manzini*, and in the Century of Optick Problems of *Eſchinardus*; and we may hope that ere long the learned Mr. *Barrow* will enrich the World with his Labours of this and other kinds; alſo Mr. *James Gregorie*, the Author of *Optica Promota*, hath a Treatiſe of this Subject in good forwardneſs for the Preſs.

5. Follows the Authors Treatiſe of *Military Architecture* or *Fortification*; in which he hath collected ſix ſeveral ways of *Regular* Fortification, and hath likewiſe divers ways for *Irregular* ones, when the Scituation of the place ſo requires; and interſperſeth divers queſtions, and relates ſome Tranſactions in the late eminent Sieges of Chriſtendome.

6. Follow his *Annularia & Cylindrica*; the firſt 4 Books whereof were firſt publiſht in 1651, and are common enough to be had here; which may make the *Reader* wonder at their being reprinted; eſpecially conſidering, that though they have deſervedly received much applauſe, yet they have likewiſe been cenſur'd for oppoſing and neglecting other Methods, whereby the Author might have rendred, what he delivers, more univerſally and briefly. Concerning the firſt 4 Books, *Ant. Lalovera* in his Book *de Geometr. veterum promota* thus;

Sero venerunt in manus noſtras R.P. Tacqueti *lib.* 4. Cylindricorum & Annularium: *Opus cenſemus abſolutiſsimum, ejuſq; Authori, qui primus hac de re ſuas lucubrationes vulgavit, iſtam coronam debitam eſſe agnoſcimus:*

And *Stephen Angeli* in his Treatiſe *de Infinitis Parabolis, deque Infinitis Solidis, &c.* (printed at *Venice* 1659.) in the *Preface* begins thus;

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[*] *Theſe* Quadrants, *printed, may very conveniently be paſted on* Copper-Plates, *and varniſht; which done, they will be not only very cheap and portable (to be had at* John Marks *at the Sign of the* Golden Ball *near* Somerſet-Houſe) *but alſo ſerviceable enough, being preſerv'd by the Varniſh from the accidental injuries of Ink and Dirt; and for theſe very cauſes made publick, ſerving for an Example to introduce the like way for other Mathematical Inſtruments.*

Publici Juris fecimus elapſo anno 1658. *libellum quendam, cui titulus,* Sexaginta Problemata Geometrica: *In hujus calce Appendiculam adjunximus, in qua occurritur* Mario Bettino, *Cavaleriana Indiviſibilia veluti Dæmonas paventi. Paucis vero tranſactis diebus a modo dicti Libelli impreſſione, incidimus forte* Venetiis *in opus Aureum* And. Tacquet, CYLINDRICA & ANNULARIA *nuncupatum; in quo cum incideremus in* Schol. *prop.* 12. *l.* 1. *Authorem carpere* Indiviſibilia *invenimus.*

Doluimus vehementer (ſaith Angeli) *Opus tanta eruditione refertum non prius ad manus noſtras perveniſſe; cenſura autem in ipſo contra* Indiviſibilia *pronunciata, parum aut nihil nos turbat: Vetera enim continet & non niſi eorum modica, & imbecilliora, quæ prius ab ipſo* Cavalerio *in Præfat.* Geometriæ Indiviſibilium, *& a* Guldino *in* Centro-baryca *objiciuntur; quibus ſatis ſuperque occurrit ipſe* Cavalerius.

And *Angeli* in the Preface of his Treatiſe *De Infinitorum Spiralium Spatiorum Menſura* (Venetiis 1660.) having occaſion to mention the fruitleſs endeavour of *Guldin* in finding the Center of Gravity of a Spiral Line, and a Right line equal thereto, ſaith thus;

P. Guldinus, *Centrobaryca* (Anno 1635. & 1640. *editæ*) *Author famoſus* (*at* Cavalerianorum Indiviſibilium *contemptor & irriſor, qui dum Indiviſibilibus irriſit, ſeipſum ridiculum præbuit*) *altius omnibus volatum ſumpſit, at conatu irrito, &* Icari *fine, ut ipſemet fatetur.*

But *Guldinus* doth not confeſs himſelf in an error in oppoſing *Cavalier's Geometria Indiviſibilium*, publiſht 1632; but ſaith, he was very aged, of an infirme memory, and that he had not (as we may gather) leiſure to peruſe it throughly, when he had health, nor health when he had leiſure. The Controverſie, and the Reply about it, is exceeding pleaſant, and to be found with other conſiderable Miſcellanies in the *Geometr. Exercitat.* of *Cavalerius* printed at *Bononia* 1647. Which Book if *Tacquet* had ſeen (for he quotes it not) he would probably not have made any ſuch oppoſition.

Angeli doth not only anſwer what is objected by *Tacquet*, but ſhews, what famous Authors he hath on his ſide, who have derived many excellent Inventions from this Method of Indiviſibles, *viz. Beaugrand, Rocca, Magiottus, Van Schoten, Rich. White, Bullialdus, Torricellius,* who calls *Cavalier's* Firſt Book the *Ocean* of *Indiviſibles*, and the *Fountain* of *Inventions.* Of which Doctrine he renders many excellent Examples.

Moreover the ſame *Angeli* in the Preface to his ſaid Tract, *De Infinit. Spiral. Spatiorum Menſura*, hath theſe words:

Pro Indiviſibilibus eſt veritas ipſa, ſtantque illi omnes præclariſſimi Geometræ, quos in Epiſt. ad Lectorem *Operis noſtri* De Infinitis Parabolis *recenſuimus; quibus nuper ultro ſe aſſociavit* Vinc. Viviani l. 1. De Maximis & Minimis, *monito poſt* Prop. 17. *ubi ait, Ut hoc loco, ex adverſo indirectæ Antiquorum viæ per duplicem poſitionem, luce clarius pateat, quantum facilitatis, brevitatis, atque evidentiæ nanciſcatur e nova directaque methodo (recte*

tamen

tamen cauteque uſurpata) acutiſſimi Cavalerii; *per* Indiviſibilium *doctrinam nobis amiciſſimam.*

And *when* thus *carefully* to apply it, of that ſee *Lalovera*'s Elementa *Tetragoniſmica Toloſæ* 1651. where *more Archimedeo* he demonſtrates the truth of this Method; which Book if *Angeli* had ſeen, he would certainly have quoted it, and admired the Author

For want of this Method, it was, ſaith *Angeli*, by way of complaint, of *Tacquet*, that he omitted ſome Theorems, which by aid thereof he might eaſily have found out. See him in his Preface to his *Infinite Spirals*; but eſpecially at *Schol.* 3. *Prop.* 15. l. 2.

Si ergo Tacquet *recepiſſet doctrinam* Cavalerii, *potuiſſet non ſolum Cubare portionem Cylindrici Parabolici ſuper quacunque Infinitarum Parabolarum per Baſin Parabolæ & Punctum in latere; ſed etiam ex iis, quæ in* Exercitat. 4. Cavalerii *tradunt ipſe &* Beaugrand, *potuiſſet Cubare Segmenta portionis cujuſcunque* Cylindrici Parabolici *reſectæ planis ſectioni maximæ parallelis: Imo ex doctrina* Cavalerii *potuiſſet etiam Cubare, & portionem* Cylindrici *ſuper* Hyperbola *per baſin Hyperbolæ & Punctum in latere, & ſegmenta hujus portionis reſectæ planis ſectioni maximæ parallelis (ſuppoſita tamen* Hyperbolæ *Quadratura.)*

Angeli finds afterwards another deſervedly famous Man, *viz.* Dr. *John Wallis*, owning and uſing the Method of *Indiviſibles*, and advancing it to admiration in his *Arithmetica Infinitorum*; who in his Book *de Cycloide* at *Oxford 1659*, ſaith thus, *Pag.* 9.

Supponimus enim (quod et facile, ſi opus eſt, probabitur) Planum quodvis tantundem hujuſmodi Converſione (ſeu Rotatione) producere, quantum eſt quod fit ex eodem Plano in lineam ipſius Centro gravitatis deſcriptam ducto; quod & de linea quavis ſive recta ſive curva, in eo Plano deſcripta, pariter intelligendum eſt: Quod quidem enim ipſe olim me primum inveniſſe putaverim, monitus mox eram, nonnihil apud Guldinum *extare quod huc ſpectet. Id autem ſi animadvertiſſet* Tacquetus, *dum de* Cylindricis *&* Annularibus *acutum Opus conſcripſit, non parum illi fuiſſet adjumento, multaque quæ illic extant, tum Univerſalius tum contractius forte fuiſſent edita.*

All which is not recited here, to diſparage our Author, but to take off the prejudice, which he may beget in his Readers againſt the Method of *Indiviſibles*, which hath been owned by other famous Men, beſides thoſe already recited; *viz.* by *Mengolus*, who from the Excellencies of *this* Method, *Archimed's* Method, and *Vieta*'s Specious *Algebra*, compos'd his *Geometria Specioſa*; by *Antimo Farby*, *alias* (as 'tis ſuggeſted) *Hon. Fabri* in Tract. *De Linea Sinuum & Cycloide*; by *Paſcal*, alias *Dettonville*; by *Des Cartes* himſelf Vol. 3. of Letters, who ſaith, that by it he ſquared the *Cycloid*, and lately by the excellent *Sluſius*, &c. 2. To remove the other prejudice that may be againſt this Author as defective: for the 5th Book *Cylindricorum* & *Annularium* (now printed with the reſt) the *Prefacer* aſſerts to be firſt extant in 1659. And becauſe we preſume, the reſt of theſe Books are already known and common, and that this hath not formerly been expos'd to ſale in *England*; and becauſe alſo it ſupplies and compenſates thoſe defects, we think fit to acquaint the Reader with the Argument thereof. The Author divides this Fifth Book into ſix parts:

1. In the firſt he demonſtrates (in 6 Lemma's and 9 *Propoſitions*) That, if any Plain Surface have a Rotation about its Axis in any Situation whatſoever, and at any diſtance whatſoever, or none, it produceth a Round Solid equal to an Upright Solid, whoſe Baſe is the begetting Figure, and Height is equal to the Circumference deſcribed by its Center of Gravity. (*This Univerſal Rule was invented by* Guldin, *and is the Baſis of moſt of his Doctrine; but he could not demonſtrate the ſame, though 'twas much deſired.*)

2. In like manner, If any *Perimeter* have a Rotation about its Axis in any Situation whatſoever, it begets a round Surface, equal to a right Surface, made by the ſame *Perimeter* as a Baſe (which may be evolv'd and made a Plain Surface) whoſe height is the way or circumference deſcribed by its Center of Gravity. This by 5 *Lemma*'s and 10 *Propoſitions*.

Theſe

Theſe being two admirable Univerſal Rules in Geometry, *the Reader will find the ſame (with many others) demonſtrated by Dr.* VVallis *in his Treatiſe* De Calculo Centri Gravitatis, *which together with his other Tracts*, De Motu, Statica, Mechanica, *are now at the Preſs in* London. *The ſame Rules are likewiſe demonſtrated in* Geometriæ parte *Univerſali* Jacobi Gregorii Scoti, *Patavii* 1668. *Of which a competent number of Copies is expected here.*

The Methods of theſe Learned Men are different, and good Arguments might be given, that they have not communicated nor ſeen the Works of each other.

Guldinus, l. 1. c. 12. *ſhews a Mechanick way to find the Center of Gravity of a Surface or Curv'd Line, by 2 free ſuſpenſions, from the points of which, perpendiculars being drawn, do croſs each other at the Center of Gravity. This we mention, to keep the Reader from taking the Center of Gravity of a Curv'd Line as ſuch (which is intended in this 2d Rule) to be the ſame with the Center of Gravity of the Figure thereby terminated in the firſt Rule.*

3. Conſiders the Affections of *Round Solids*, begot from a *Parabola*, in 10 *Propoſitions* from *Numb.* 20. *to* 29. both *incluſive*; whereof the 21 and 23 gives the *Hoof* required by *Angeli*, which was formerly cubed by *Greg. de S. Vincentio*. In the 27th *Prop.* he gives the Proportion of the *Parabolical Conoid* to the *Spindle* made of the ſame *Parabola* by rotation about its Baſe, to be, As the *Baſe* of the *Parabola* is to $\frac{16}{15}$ of the *Axis*; ſhewing, that *Guldinus* err'd through forgetfulneſs. In *Prop.* 29. he delivers, that the *Parabola* bears ſuch a proportion to a *Circle* deſcrib'd about the *Baſe* thereof as a Diameter, As the *Axis* of the *Parabola* doth to that *Circumference* of a Circle, whoſe *Radius* is equal to the diſtance of the Center of Gravity of the *Semi-Parabola* from the *Axis.*

4. Contains divers endeavors and manifold new ways towards the obtaining the *Quadrature* of the *Circle* in 12 *Propoſitions.*

5. Contains 10 Propoſitions, from 41 to 51; in the 42th whereof he finds a *Sphere* equal to an *Hyperbolical Ring-Solid*; whence divers ways are open'd towards the attaining the *Quadrature* of the *Hyperbola*: And he finds a Sphere equal to a Ring made by the Rotation of a *Segment* of an *Hyperbola*, and of the *Segment* of a *Circle* thereto annexed, deſcribed about the Baſe of the *Hyperbola* as a Chord Line: Then he abſolutely cubes certain *Hoofs* cut out of an *Hyperbolical Cylinder*, and thence derives other ways towards the obtaining the *Quadrature* of the *Hyperbola.*

6. Delivers 3 Theorems, ſhewing the proportion between an *Hyperbola* and a *Circle*: which are conceived to be wholly new.

But theſe *Theorems* ſuppoſe the *Quadrature* of *both Figures* known, *viz. That* of a Circle, in requiring the length of the *Circumference* of a *Circle*, deſcribed by the *Center* of *Gravity* of an *Hyperbola*; which Center cannot be found, without giving the *Quadrature* or *Area* of the *Hyperbola*: which hath been moſt happily perform'd by *M. Mercator* in his *Logarithmo-Technia* and further advanc'd by Dr. *Wallis* in N. 38. of theſe *Tranſactions*; and by *M. Gregorii* alſo further promoted and otherwiſe perform'd in his *Exercitationes Geometricæ*, where he ſhews, the ſame *Methods* and *Approaches* to be likewiſe applicable to the *Circle.*

What we have ſaid, being an Account of one of the moſt conſiderable Volumes of Mathematicks extant, we hope we may be the better excuſed for prolixity. This Author formerly publiſh'd the *Elements* of *Plain* and *Solid* Geometry in 8°, and an *Arithmetick* in 8°, wherein he promiſed a Treatiſe of *Algebra.*

Errat. P. 865. l. 24. *r. m* P C; p. 866. l 3. *del. ſiniſtrorſum*; *ibid.* l. 18. *r. Gravitationem*; *ib.* l. 24 *.r. progreſſivo*; *ib.* l. 29. *r. ſit*; p. 867. l. 23. *r. improprie.*

☞ P. 863. Inſert immediately before theſe words [*Lege ſyllabas*, *Regula.* R*e*, S*e*, faciunt *oR*, *o*S: R*o*, S*o* faciunt *e*S, *e*R.

In the *SAVOY*,
Printed by *T. N.* for *John Martyn*, Printer to the *Royal Society*, and are
to be ſold at the *Bell* a little without *Temple-Bar*, 1668.